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ABSTRACT

Research confirms that readiness skills for literacy and mathematics begin at birth and are developed in combination with life experiences. This guide provides early childhood educators a set of basic guidelines or Foundation Blocks in literacy and mathematics, with indicators of success for entering kindergarten based on scientifically-based research. The guide describes specific indicators for prekindergarten children in the content areas of reading (oral expression, vocabulary, phonological awareness, letter knowledge and early word recognition, print and book awareness, and written expression) and mathematics (number sense, computation and estimation, measurement, geometry, statistics, and patterns, functions and algebra). The guide is organized for use as a tool for early childhood educators in developing curriculum and meaningful classroom activities. Each Foundation Block is in box format, and is organized to build toward the Virginia Kindergarten Standards of Learning. Following the boxes are expectation indicators for the Foundation Blocks. Sample teaching activities are included to assist teachers in the planning of meaningful classroom activities. Helpful terms and 16 references to national consensus documents used in the development of this guide are cited for clarification and resource purposes. (HTH)

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Virginia's Foundation Blocks for Early Learning:

Guidelines for Literacy and Mathematics

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Virginia's Foundation Blocks for Early Learning:

Guidelines for Literacy and Mathematics

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2003

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NOTICE TO THE READER

Virginia's Foundation Blocks for Early Learning: Guidelines for Literacy and Mathematics can be found in PDF file format on the Virginia Department of Education's Web site at http://www.pen.k12.va.us.

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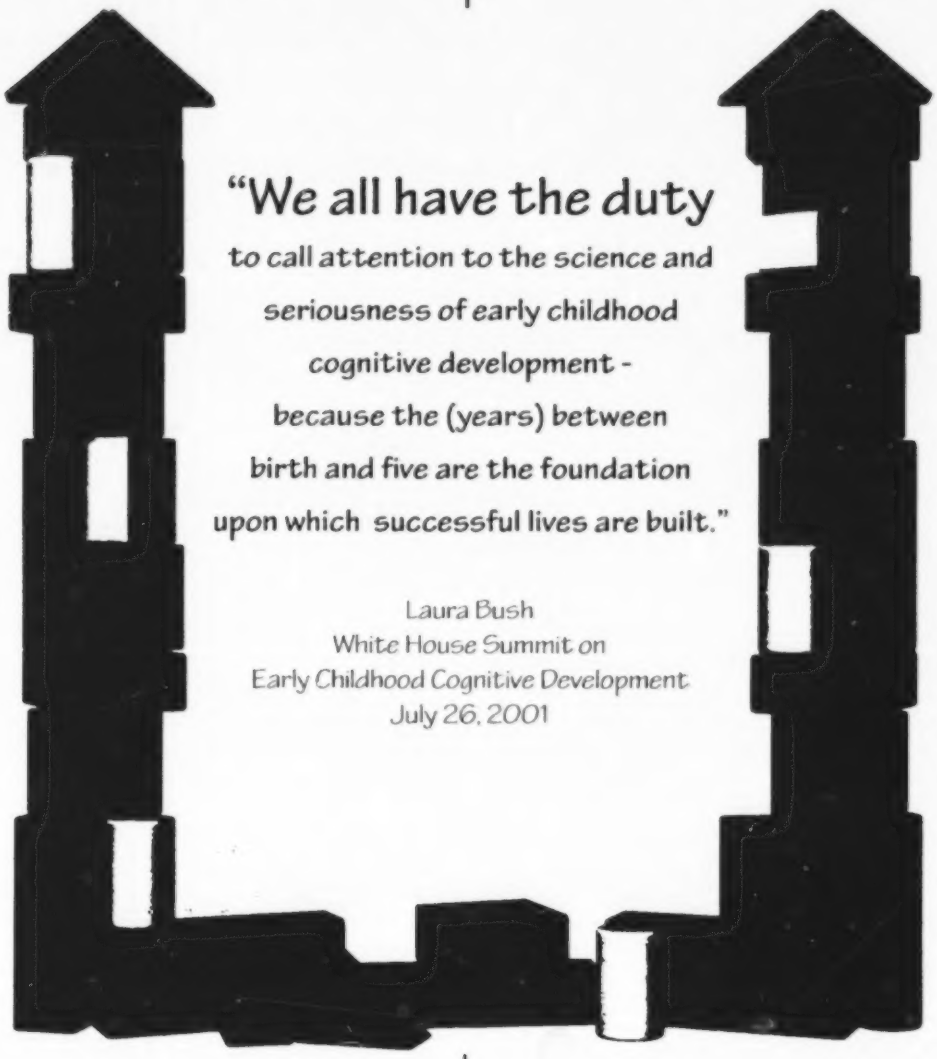


"We all have the duty
to call attention to the science and
seriousness of early childhood
cognitive development -
because the (years) between
birth and five are the foundation
upon which successful lives are built."

Laura Bush
White House Summit on
Early Childhood Cognitive Development
July 26, 2001

Overview of Foundation Blocks

Research confirms that readiness skills for literacy and mathematics begin at birth and are developed in combination with life experiences. Children experiment and explore along various learning paths, or similar sequences, as they acquire literacy and mathematical skills. This does not mean, however, one can predict with confidence where a child of any given age will be along a particular learning path. Variation in development of literacy and mathematical skills is considered the norm.

Therefore, the value of early education is imperative to the future academic success and the growth of children's intellectual development in No Child Left Behind (2001). Virginia's Foundation Blocks for Early Learning: Guidelines for Literacy and Mathematics attempts to establish a measurable range of skills and knowledge essential for four-year-olds to be successful in kindergarten.

The purpose of this document, then, is to provide early childhood educators a set of basic guidelines in literacy and mathematics with indicators of success for entering kindergarten based on scientifically-based research. The guidelines reflect a consensus of children's conceptual learning, acquisition of basic knowledge, and participation in meaningful and relevant learning experiences. Alignment to Virginia's Kindergarten Standards of Learning (SOL), to Virginia's Phonological Awareness Literacy Screening (PALS), and to the national guide, Teaching Our Youngest, A Guide for Preschool Teachers and Child-Care and Family Providers is evident.

Virginia's Foundation Blocks for Early Learning describe specific indicators for prekindergarten children in the content areas of reading and mathematics. Oral expression, vocabulary, phonological awareness, letter knowledge and early word recognition, print and book awareness, and written expression are emphasized in Literacy, and number sense, computation and estimation, measurement, geometry, statistics, and patterns, functions, and algebra in Mathematics, all of which are addressed in the Virginia Standards of Learning.

The material is organized for use as a tool for early childhood educators in developing curriculum and meaningful classroom activities. Each Foundation Block is in box format, and is organized to build towards the Virginia Kindergarten Standards of Learning. Following the boxes, are expectation indicators for the Foundation Blocks. Sample teaching activities are included to assist teachers in the planning of meaningful classroom activities. Helpful terms and references to national consensus documents used in the development of this document are cited for clarification and resource purposes.

Limited English Proficiency (LEP)

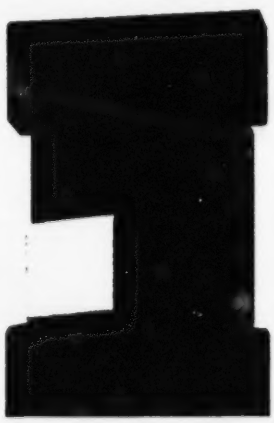
As we consider development of literacy and mathematical skills, it is important to recognize the needs of limited English proficient (LEP) children. Regardless of what language is used, it is the acquisition of that language that is essential to the LEP child's cognitive and social development.

Educators recognize that children with limited English proficiency come to school with previously acquired knowledge and learning as a result of the language used in their home. For young children, the language of the home is the language they have used since birth, the language they use to make and establish meaningful communicative relationships, and the language they use to begin to construct their knowledge and test their learning. The home language is directly tied to the children's culture, values, and attitudes.

Just as children learn and develop at different rates, individual differences exist as LEP children acquire English. For example, some children may experience a silent period while they acquire English; other children may practice their knowledge by mixing or combining languages; still other children may seem to have acquired English language skills, but are not truly proficient; others will quickly acquire English-language proficiency. Each child's progress in learning a new language should be viewed as acceptable, logical, and part of the ongoing process of learning a new language.

The types of instructional activities typically present in early childhood programs facilitate the development of English for LEP students. Some examples of such activities are: using realia, hands-on activities, repetition, visual representations, and experiential activities. All of these activities provide a context for learning, critical for all children, but especially critical for LEP children.

Young LEP children may seem to be fluent and at ease with English, but may not be fully capable of understanding or expressing themselves in the more complex aspects of language. Although LEP children may seem to be speaking a second language with ease, speaking a language does not equate to being proficient in that language. They may demonstrate weaknesses in language learning skills, including vocabulary skills, auditory memory and discrimination skills, simple problem-solving tasks, and the ability to follow sequenced directions. Typically, these deficiencies tend to disappear for young LEP children within one to two years of direct instruction in English.



Literacy

Introduction

Becoming a successful reader is dependent upon children's experiences and knowledge in listening, speaking, reading, and writing. Given quality opportunities to interact with responsive adults and peers in language and print rich environments, young children develop knowledge of the world around them through listening and speaking skills, phonological awareness, letter knowledge and print awareness, comprehension, vocabulary and word meanings, and writing. The following are definitions based on scientifically based reading research that will help frame the categories of Literacy Foundation Blocks.

Oral language experiences include communication activities that focus on speaking and listening. Educators and caregivers of young children must engage them in conversation throughout a daily and consistent routine, asking open-ended questions and presenting new words to allow expansion of vocabulary. In addition, being responsive to children's questions and allowing them to lead the conversation are essential in building oral language skills.

Reading begins early with the connection that print and sound are related, and occurs through daily experiences predictive of early success in reading. Phonological awareness or the ability to notice and manipulate sounds in spoken language includes alliteration, or identifying the same beginning consonant sounds in a group of words, recognizing and producing rhymes, and segmenting, or separating individual syllables into sounds. Through these kinds of daily routine activities, young children begin to develop initial understandings about reading and how it relates to their surroundings.

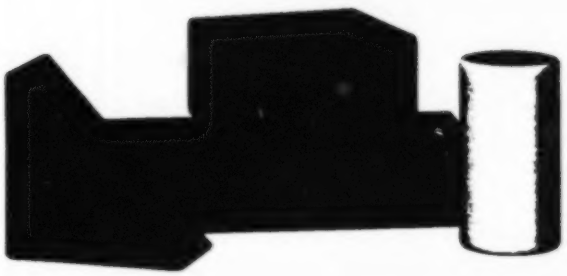
Writing is intriguing to children as adults around them use it as a means of communication. Reading, language, and writing become intertwined as children develop and follow a sequence of progression through routine practice in classroom activities. Thus, it is imperative for teachers to allow this progression to take place and offer it in relation to other literacy activities.

Research concludes that children who progress well in literacy development are immersed in environments consisting of rich children's literature, varied and frequent language experiences, and many opportunities to write. Conversely, children who are not progressing to expectations benefit from more of these kinds of activities in addition to more explicit classroom experiences. By listening and telling stories, reading aloud on a routine basis, rereading familiar texts, and providing repeated opportunities to write, children will develop literacy skills for later reading success.

Literacy Foundation Blocks

Oral Language:

- The child will develop listening and speaking skills by communicating experiences and ideas through oral expression.
- The child will develop an understanding of words and word meanings through the use of appropriate vocabulary.



Reading:

- The child will manipulate various units of sounds in words.
- The child will demonstrate basic knowledge of the alphabetic principle.
- The child will demonstrate knowledge of print concepts.

Writing:

- The child will write using a variety of media.

Virginia Literacy Foundation Block 1

Oral Expression

The child will develop listening and speaking skills by communicating experiences and ideas through oral expression.

ORAL EXPRESSION

Children gain language and vocabulary skills by having multiple and frequent opportunities to talk, as well as listen to adults and peers. These opportunities must be daily and routine as children begin to read and write.

- Listen with increasing attention to spoken language, conversations, and stories read aloud
- Correctly identify characters, objects, and actions in a picture book, as well as stories read aloud, and begin to comment about each
- Make predictions about what might happen in a story
- Use two words to ask and answer questions to include actions
- Use appropriate language for a variety of purposes (e.g., ask questions, express needs, get information)
- Engage in turn taking exchanges and rules of polite conversation with adults and peers
- Listen attentively to stories in a whole-class setting

Sample Activities

- Engage children in conversation throughout the daily routine.
- Respond to children's communication and allow the child to take the conversational lead.
- Present new words to expand vocabulary on a routine basis.
- Ask open-ended questions to elicit responses from children and ask follow up questions after a response to allow expansion opportunities.
- Play games to focus on listening carefully.
- Consistently reinforce rules of good listening and speaking in the daily routine.
- When reading aloud, provide opportunities for children to predict what will happen next, to comment on the story, and to connect the story to personal experiences.

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2 Virginia Literacy Foundation Block 2

Vocabulary

The child will develop an understanding of words and word meanings through the use of appropriate vocabulary.

VOCABULARY

The more children know about the world around them, the easier it is for them to express new information, ideas and vocabulary in communicating this knowledge. Helping children to relate experiences to new ideas and concepts also assists in the development of vocabulary and related skills.

- Use single words to label objects
- Listen with increasing understanding to conversations and directions
- Follow simple, one-step oral directions
- Engage in turn taking exchanges with adults and peers
- Use new vocabulary with increasing frequency to express and describe feelings and ideas

Sample Activities

- Read books and stories aloud to children daily, e.g., The Enormous Watermelon; make a pretend garden by taping brown paper to the floor, tape seeds in a row and section off with masking tape; make garden signs with pictures of items related to gardening. (e.g., rake, shovel, vegetables, potting soil, watering can, etc).
- Have children walk along the garden row and name the pictures on the garden signs.
- Provide daily opportunities for children to engage in conversations in dramatic play center by adding props related to themes.
- Play Simon Says.

Virginia Literacy Foundation Block 3

Phonological Awareness

The child will manipulate the various units of sounds in words.

PHONOLOGICAL AWARENESS

Phonological awareness involves the understanding of sounds in spoken words, and is highly predictive of a young child's success in beginning to read. Children's abilities to manipulate sounds in spoken words and learning to read are connected through rhyming, common initial sounds (alliteration), blending and segmentation, all of which are equally important. Research shows that how quickly children learn to read often depends on how much phonological awareness they have when entering kindergarten.

- Successfully detect beginning sounds in words
- Listen to two one-syllable words and blend together to form the compound word (e.g., rain, bow is rainbow)
- Identify words that rhyme, generate simple rhymes
- Listen to a sequence of separate sounds in words with three phonemes and correctly blend the sounds to form the whole word (e.g., cat = /k/ /a/ /t/)

Sample Activities

- Ask children to listen for a target sound, (e.g., /t/). Have children put "thumbs up" if they hear the /t/ sound or thumbs down if they do not hear the /t/ sound at the beginning of words.
- Play rhyming word games, like making up new verses to familiar songs or rhymes OR replace familiar rhymes with silly ones, like "Humpty Dumpty", "Gumpty, Numpty".
- Repeat rhyming songs and poems; raise your voice when the words rhyme.
- Use words from a story you have just read aloud. Ask children to listen to pairs of words and determine if they rhyme.

TIP:

When teachers segment words into individual sounds, avoid adding an extra vowel sound after each phoneme. For example, avoid saying /kuh/ /ah/ /tuh/ for "cat".

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Virginia Literacy Foundation Block 4

Letter Knowledge and Early Word Recognition

The child will demonstrate basic knowledge of the alphabetic principle.

LETTER KNOWLEDGE AND EARLY WORD RECOGNITION

Letter knowledge is an essential component to begin reading and writing successfully. Functions of letters in writing and their connection to sounds are critical components in children's success in learning to read. In combination with phonological awareness, letter knowledge is the critical indicator to children's understanding of the alphabetic principle and the beginning connection to printed words.

- Correctly identify 10-18 alphabet (uppercase) letters by name in random order
- Select a letter to represent a sound (8-10 letters)
- Correctly provide the most common sound for 5-8 letters
- Read simple/familiar high-frequency words, including his or her name
- Notice letters around him/her in familiar, everyday life, and ask how to spell words, names or titles

Sample Activities

- The teacher will place large letter cards (bold print on 8 1/2 x 11 paper) in a circle on the floor. Play music and have the children march around the alphabet. When the music stops, the child stops and picks up a letter. Allow each child to give the name of the letter he or she is holding. To extend the activity, have the child give the sound that the letter makes and think of a word that begins with that sound.
- Provide varied forms of printed materials and props in centers for dramatic play. Some examples would include: menus, calendars, labels, pictures, and photographs with captions, recipes, envelopes with printed words, etc.
- Allow children to "type" on a computer keyboard. Encourage them to "type" their name and print it.
- Have children experiment and explore with various types of letters: magnetic letters, alphabet tiles, almost anything can be used to attach letters of the alphabet.
- Provide opportunities for children to trace, model, and create letters with paint, yarn, pipe cleaners, play dough, sand, pudding, shaving cream, etc.

Virginia Literacy Foundation Block 5

Print and Book Awareness

The child will demonstrate knowledge of print concepts.

PRINT AND BOOK AWARENESS

Through daily experiences with reading and writing, young children learn basic concepts regarding the printed word. They learn that print conveys meaning and pictures are representations of print. Young children begin to understand there is a correlation between spoken and written words by following the print as it is read aloud. An understanding that reading and writing are ways to obtain information and knowledge, generate and communicate thoughts and ideas, and solve problems is developed as young children routinely and consistently experiment with exploring books and print.

- Identify the front of a book
- Identify the location of the title of a book
- Identify where reading begins on a page (first word or group of words)
- Demonstrate directionality of reading left to right on a page
- Identify part of the book that "tells the story" (print as opposed to pictures)
- Turn pages one at a time from the front to the back of a book

Sample Activities

- The teacher displays a book, tells the children "this is the front of the book", and reads the title of the book while pointing out each word, "this is the title of the book".
- The teacher opens the book, "we will read this page first," and continues modeling to point out first word, "we read this way," moving finger from left to right (tracking). This should become a routine daily practice when reading to children aloud (voice-to-print match).
- Teach the children the following song to the tune of Head, Shoulders, Knees, and Toes:

  Top to bottom, left to right, left to right;
  Top to bottom, left to right, left to right;
  Top to bottom, left to right, left to right;
  Top to bottom, left to right, left to right.

- Introduce various forms of print and talk about why people read with different types of print. Forms of print can include: non-fiction topic books, how-to books, poetry books, and storybooks.

Virginia Literacy Foundation Block 6

Written Expression

The child will write using a variety of materials.

WRITTEN EXPRESSION

Through early writing experiences, young children develop understandings about the functions of written language. They begin to generate ideas about how written language works and explore its uses. Young children's attempts to write through scribbling, forms, and inventive spellings help them to understand writing as a means to communicate ideas and information. Over time, attempts at early writing will more closely align to conventional writing.

- Copy letters using various materials
- Print first name independently
- Print 5 - 8 letters with a pencil using appropriate grip
- Copy simple words (3 -5 letters)
- Use inventive spellings to convey messages or tell story

Sample Activities

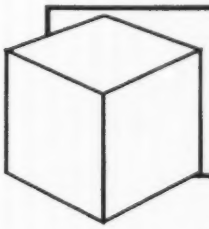
- Place baking flour (various other materials like shaving cream, pudding, paint, sand etc.) in tray and alphabet cards on a table. Have children use their finger to copy letters, drawing them in the flour. After a letter is copied, the child can gently shake (wipe) the tray to "erase" the letter and copy the next letter. This activity can be expanded for copying names and short words.
- Provide opportunities for children to write in a variety of contexts.
- Place clipboards with unlined paper and a variety of writing materials (colored pencils, crayons, markers) in learning centers.
- Provide a classroom Post Office.
- Encourage children to "write" about their play (e.g., what they build in the block center, grocery lists in the dramatic play center, etc).
- Encourage children to dictate words, phrases, or sentences to an adult recording on paper.

Mathematics

Introduction

Young children are natural learners, and they bring informal mathematics knowledge and experiences to the preschool classroom. They continually construct mathematical ideas based on their experiences with the environment, their interactions with adults and other children, and their daily observations. Children approach new tasks with curiosity and a sense of experimentation.

Mathematics learning builds on these characteristics of young children, and challenges children to explore ideas about patterns and relationships, order and predictability, and logic and meaning. Appropriate instruction occurs in environments that are rich in language, encourage children's thinking, and nurture children's explorations and ideas. These ideas include the concepts of number, pattern, measurement, shape, space, and classification.



Mathematics Foundation Blocks

Number and Number Sense:

- The child will count with understanding, and use numbers to tell how many, describe order, and compare.

Computation and Estimation:

- The child will recognize change in groups (sets/collections).

Measurement:

- The child will identify and compare the attributes of length, capacity, weight, time, and temperature.

Geometry

- The child will describe simple geometric shapes (circle, triangle, rectangle - including square) and indicate their position in relation to him/herself, and to other objects.

Statistics:

- The child will participate in the data gathering process in order to answer questions of interest.

Patterns, Functions, and Algebra:

- The child will identify simple patterns of concrete objects and use them to recognize relationships.

Virginia Mathematics Foundation Block 1

Number and Number Sense

The child will count with understanding, and use numbers to tell how many, describe order, and compare.

NUMBER AND NUMBER SENSE

Young children enter pre-school with a foundation of experiences with number. To grow in an understanding of number and develop number sense, children must have daily experiences involving comparison and counting in ways that are personally meaningful and challenging.

- Count with understanding to 20 or more
- Count a group (set/collection) of three to five objects by touching each object as it is counted and saying the correct number (one-to-one correspondence)
- Count the items in a collection of one to five items and know the last counting word tells "how many"
- Compare two groups (sets/collections) of matched objects (less than five) and describe the groups using the terms more, fewer, or same

Sample Activities

- Include counting as part of the daily routine (lunch count, attendance, distributing snack items).
- Provide collections of three to five objects (buttons, plastic animals, plastic lids, keys) that encourage counting.
- Read counting books.
- Encourage one-to-one correspondence as children hand out materials (one item for each child).
- Include counting as a part of special classroom activities and materials (recipes, recording science observations, names).
- Ask children, as they line up, who is first in the line, second, third. As children participate in races on the playground, ask who crossed the line first, second, third (ordinal numbers).
- Provide opportunities for rote counting which involves saying the numbers or singing the numbers as far as students can count in the correct, memorized order. Similar to reciting or singing the alphabet song, students need many experiences saying the number names in sequence before they are able to count meaningfully.
- Share Big Book stories and poems with children, e.g., "Five Little Ducks". Point out the numerals 1 through 5 in the poem by tracing over them and having children make the numeral in the air with their hands, pointing to each duck as you say the number. As the child becomes more familiar with the value of numerals (symbols for numbers one through five), point out the corresponding number of objects in stories and pictures.
- Distribute five napkins and place three cookies on three of the five napkins. Encourage meaningful discussion about which group has more, the cookies or the napkins. Use matching and counting to determine if groups have more, fewer or the same.

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Virginia Mathematics Foundation Block 2

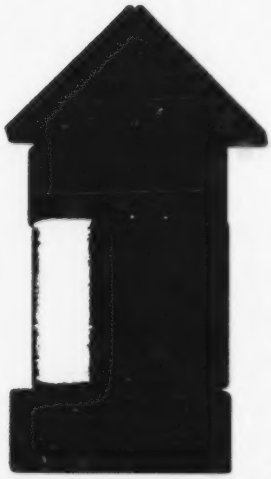
Computation and Estimation

The child will recognize change in groups (sets/collections).

COMPUTATION AND ESTIMATION

Young children notice the effects of increasing or decreasing the items in a collection of objects. To develop an understanding of computation children need many opportunities to match and count objects to find out more dependably which quantity is more, and to use counting to describe changes in a set.

- Describe changes in groups (sets/collections) by using more when groups of objects (sets) are combined (added together)
- Describe changes in groups (sets/collections) by using fewer when groups of objects (sets) are separated (taken away)



Sample Activities

- Tell stories and have the children use counting objects (toy cars, toy animals, cookie shapes) to solve problems involving adding together or combining groups. For example, "A mama bear and a daddy bear are walking in the woods with their two baby bears. How many bears altogether?".
- Describe stories where groups or objects are taken away or separated. For example, "three cars were parked in front of the school, then two cars drove away; how many are left? Five goldfish swam in the aquarium; the teacher used a net to take two out. How many goldfish are left in the aquarium?" Have the children use goldfish crackers or toy cars to show what happens in each story.
- Use predictable fingerplays and traditional counting songs, i.e., "Five Little Monkeys", "Ten in the Bed" to practice adding and taking away objects. Have students act out the songs and fingerplays or use finger puppets to represent the characters as they determine how many are left or how many are added.

Virginia Mathematics Foundation Block 3

Measurement

The child will identify and compare the attributes of length, capacity, weight, time, and temperature.

MEASUREMENT

Children naturally make comparisons. From a very young age on, children are comparing who is taller and who has more. Comparison is the first step in developing an understanding of measurement. Young children should be immersed in activities that allow them to use their senses to make these direct comparisons. They should also be exposed informally to tools that are used for measurement.

- Recognize attributes of length by using the terms longer or shorter when comparing two objects
- Know the correct names for the standard tools used for telling time and temperature; and measuring length, capacity, and weight (clocks, calendars, thermometers, rulers, measuring cups, and scales)
- Use the appropriate vocabulary when comparing temperatures (e.g., hot, cold)
- Use appropriate vocabulary when describing duration of time (e.g., hour, day, week, month, morning, afternoon, night, day)

Sample Activities

- Ask children to match two pencils or crayons of different lengths, by matching one end of the object with the end of the object being compared. Ask the student to tell which of the two objects is longer and which is shorter. Provide students with opportunities to compare many examples of length, i.e., lines of students, lines of cups on a table.
- When using the standard tools for telling time and measuring attributes of length, capacity, and weight (clocks, calendars, balance scales, thermometers, rulers, measuring cups) in daily routines and activities, have children use the correct terms for the tools.
- Plan food preparation activities to include the use of clocks, thermometers, and balance scales.
- Share pictures and real examples of various kinds of clocks (e.g., analog, digital); thermometers (e.g., dial, mercury column); and scales (e.g., two-pan, produce department/grocery store, bathroom).
- Explore the concept of weight by holding two different objects and determining which one is heavier, labeling one heavier and the other lighter. Children can also begin to place objects on a balance scale and determine if they balance (weigh the same), or if one pan is lower than the other, (the object weighs more). Making discoveries and predictions using skills related to balance leads to standard measurement experiences.
- Explore the concept of volume by using common objects (shoes, fruit, blocks, balls, marbles, sand, or water) to fill the space of a given container (trash can, box, milk cartons, pitchers). These activities will help students to realize that objects can fill space and that containers have space (volume) inside.

Virginia Mathematics Foundation Block 4

Geometry

The child will describe simple geometric shapes (circle, triangle, rectangle - including square) and indicate their position in relation to him/herself and to other objects.

GEOMETRY

Geometry for young children involves observing and describing the shapes that are found everywhere in their environment. Children naturally use geometric shapes and spatial comparisons as they begin to express themselves through drawing and constructions. This familiarity is a foundation for learning experiences involving shape, position, and orientation in space.

- Match and sort shapes (circle, triangle, rectangle - including square)
- Describe how shapes are alike and different
- Recognize shapes (circle, triangle, rectangle - including square) by pointing to the appropriate figure when the teacher names the shape
- Describe the position of objects in relation to other objects and themselves using the terms next to, beside, above, below, under, over, top, and bottom

Sample Activities

- Provide opportunities for students to find shapes in their environment, inside and outside the classroom. They should see all sorts of shapes, find some that are alike and different, and use the appropriate language to describe how they are alike and different. Children should also find shapes that are like a given shape. Provide many experiences for children to draw, cut out, build and talk about shapes.
- Create cutouts of shapes (circle, triangle, rectangle - including square) out of various types of materials (plastic lids, construction paper, cardboard, fabric). Have children use the cutout shapes to sort into groups. Have children describe the ways they have sorted the shapes, i.e., by color, shape, number, and texture. Encourage the students to label the shapes with the appropriate terms.
- Create an obstacle course in the classroom or on the playground. Ask children to describe their positions as they move through the course, i.e. next to the desk, below the table, over the chair. The children should also describe the position of other objects in relation to themselves, i.e., the climbing bars are above the child, the sandbox is below the child, the swings are next to the child.
- Expose children to three-dimensional shapes through everyday experiences with cans (cylinders), balls (spheres), and playground cones or ice-cream cones. Teachers can describe these objects and refer to their mathematical names.
- Provide children with a variety of materials to make shapes by tracing around cutouts of shapes and combining them to create pictures.
- Provide many opportunities for children to build with blocks (unit blocks, legos, discovery blocks) giving children meaningful experiences using geometric shapes.

Virginia Mathematics Foundation Block 5

Statistics

The child will participate in the data gathering process in order to answer questions of interest.

STATISTICS

Children are natural questioners; they start asking questions and finding out opinions from a young age. To build upon this strength, children need to ask questions, collect answers, and then talk about what they found out. Analyzing data is a key step in making sense of information and the world around us.

- Collect information to answer questions of interest to children
- Use descriptive language to compare data in objects and picture graphs by identifying which is more, fewer, or the same

Sample Activities

- Provide opportunities for children to participate in the process of collecting data about a question, i.e., "How did you come to school today?" Children can place a picture of a car, bus, or a person walking on a graph to indicate the way they traveled to school. Toy vehicles and toy people may be used as well. Ask questions about the graph once it is complete, i.e., "Which way of traveling (by car, by bus, or walking) was used by more children? Which way was used by fewer children?"
- Use the children themselves to create a real graph of the data. For example, have students stand in groups by the types of shoes they are wearing. Then have students count the number of children who have each type of shoe. Record the information in a picture graph for students to use in comparing the data. Ask questions about the picture graph.

Virginia Mathematics Foundation Block 6

Patterns, Functions, and Algebra

The child will identify simple patterns of concrete objects, and use them to recognize relationships.

PATTERNS, FUNCTIONS, ALGEBRA

Algebra begins with a search for patterns. Being able to identify patterns allows young children to make generalizations and predictions beyond the information directly available. The recognition and analysis of patterns are important components of a child's intellectual development. Children should have many opportunities to engage in pattern related activities and recognize patterns in their everyday environment.

- Identify and explore simple patterns (i.e., AB; AB; red, blue; red, blue)
- Use patterns to predict relationships between objects, i.e., the blue shape follows the yellow shape, the triangle follows the square

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Sample Activities

- Provide children with wallpaper samples that have simple patterns, and ask them to predict what would come next in the pattern.
- Provide children with many opportunities to observe patterns in the environment, i.e., in clothing, buildings, brick walls, etc. Patterns are part of the world in which we live. The child should be helped in becoming aware of patterns and ways to make patterns.
- Involve students in predicting patterns when lining up students by starting the line with a boy, a girl; a boy, a girl. Have the students predict who would come next.

Helpful Terms

Listed below are some terms one may encounter in reading more about early childhood education.

Alliteration The same consonant sounds at the beginning of words in a sentence, group of words, or a line of poetry. For example, the sound of "P" in Peter Piper picked a peck of pickled peppers.

Alphabetic principle The use of letters and letter combinations to systematically represent sounds/phonemes. For example, the word ship has four letters, but only three sounds/phonemes (sh-i-p).

Cognitive development Children's development of knowledge and skills, which help them to think about and understand the world around them.

Decoding The translation of letters in written words into recognizable sounds and combining these sounds into meaningful words.

Emergent literacy The view that literacy learning begins at birth and is encouraged through participation with adults in meaningful literacy-related activities.

Environmental print Printed materials that are part of everyday life, including signs, billboards, labels, and business logos.

Explicit instruction Teaching children in a direct, systematic, and sequential manner.

Experimental writing Young children experiment with writing by creating pretend and real letters and by organizing scribbles and marks on paper.

Graphing The picturing of information in an organized manner, resulting in a graph. There are several types of graphs, including bar graphs and pictographs.

Invented spelling Phonemic-based spelling where children create their own nonconventional spelling.

Letter knowledge The ability to identify the names and shapes of the letters of the alphabet.

Journals Books in which young learners scribble, draw, and use their own spellings to write about their experiences.

Literacy Includes all the activities involved in speaking, listening, reading, writing, and appreciating both spoken and written language.

Model The hands-on materials, such as pictures, blocks, counters, and flash cards, which are used to demonstrate a concept. When you use these materials to represent a concept, you "model" the concept.

Non-standard units of measure Units of measure whose values may vary, such as a person's foot length, a handful, or paces. These are unlike standard units of measure, such as inches and pounds, whose values do not vary.

Number An abstract concept involving a quantity. For example, if you see ◆ ◆ ◆, you think of the number three.

Numeral The written symbols that represent a number. For example, "12" and "XII" are numerals for the number twelve.

One-to-one matching Matching one set of objects with another set of objects. For example, in a group of cups and saucers, you might match one cup with each saucer.

Ordering Placing a collection of items from largest to smallest or smallest to largest.

Ordinal numbers A number that tells the position of people or things in order.

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Phonemes The smallest parts of spoken language that combine to form words. For example, the word hat is made up of three phonemes (h-a-t) and differs by one phoneme from the words pat, had and hot.

Phonics The relationships between the sounds of spoken language and the individual letters or groups of letters that represent those sounds/phonemes in written language.

Phonological awareness The ability to notice and work with the sounds in language. Phonological awareness activities can involve work with alliteration, rhymes, and separating individual syllables into sounds.

Pictograph A type of graph that displays information as pictures on a chart.

Print awareness The knowledge that printed words carry meaning, and reading and writing are ways to obtain ideas and information. A young child's sensitivity to print is one of the first steps toward reading.

Rote counting Saying the names of the numbers starting with one: one, two, three, and so on.

Scaffolded instruction Instruction in which adults build upon what children already know and provide support that allows children to perform more complex tasks.

Set A collection of things belonging together according to a rule such as things that are all squares, red, or round.

Set counting Counting the number of objects together because they belong together for some reason.

Sight vocabulary Words a reader recognizes automatically without having to sound them out.

Spatial reasoning A sense of shapes and how they relate to each other.

Statistics The science of assembling, classifying, and analyzing facts or data.

Unit measure A consistent quantity used for measuring (i.e., cube, block).

Vocabulary The words we know to communicate effectively. Oral vocabulary refers to words we use in speaking or recognize in listening. Reading vocabulary refers to words we recognize or use in print.

Volume The amount of space inside an object; the number of unit measures that it will take to fill the object. For example, the number of cups it will take to fill a gallon container is the volume of that container as measured in cups.

Word recognition The ability to identify printed words using strategies such as recognition by sight or decoding to determine meaning.

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Resources

Listed below are additional resources that will provide more information about early childhood education. An * denotes a reference used for development of this document.

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